National Transportation Safety Board
Washington, D.C. 20594

Report Date: April 7, 2008

Environmental Response Group Chairman's Factual Report

A. Accident Identification

Description: *Cosco Busan* Allision with San Francisco-Oakland Bay Bridge
Commodity: Intermediate Grade Fuel Oil (IFO-380)
Location: San Francisco Bay
Date/Time: November 7, 2007, 08:30 PST
NTSB No.: DCA08MM004

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C. Accident Summary

On Wednesday, November 7, 2007, about 0830 (LMT), the Hong Kong-registered, 901-foot container ship *Cosco Busan* allided with the fendering system at the base of the delta tower of the San Francisco-Oakland Bay Bridge (Bay Bridge). The ship was outbound from berth 56 in the port of Oakland carrying a load 2,529 containers, and was destined for Busan, Korea.

The vessel was scheduled to depart the berth at 0630. A San Francisco Bar Pilot arrived at the vessel about 0620 and met with the captain of the vessel. Due to restricted visibility in the harbor, the pilot and Master postponed sailing until visibility improved. While waiting for the visibility to improve, the pilot, master, and watch mate adjusted (tuned) the ship's two radars with regard to picture display and target acquisition on the ARPA (automatic radar plotting aid) until the pilot was satisfied the radars were performing acceptably. According to the VDR transcript, the ship's sailing was also delayed by the need to complete some ships paperwork. About 0730, the pilot estimated visibility had improved to approximately ¼ mile and according to the pilot's statement, he consulted with the master before getting underway.

About 0745 the vessel departed berth 56 with the aid of the tractor tug *Revolution* on the port quarter pulling with 1 line and the ship's 2700 HP bow thruster. The bridge navigation crew consisted of the master, the third mate, a helmsman and the pilot. The chief mate and a lookout were on the bow, and the second mate was on the stern. After the vessel eased off the dock, the pilot had the tug shift around to the center chock on the stern as a precaution for the outbound transit in the reduced visibility "for insurance in case I needed help in the middle of the channel" and started making headway out of the estuary.[1] The dredge *Njord* was working towards the end and on the west side of the estuary and the *Cosco Busan* passed to the right of it without incident.

The pilot stated as the *Cosco Busan* continued to make its way out of the Inner Harbor Entrance Channel, he could see the #4 and #6 buoys pass by and noted that their associated lights were visible. He kept the vessel to the high side of the channel as he departed the estuary in anticipation of the flood current he would encounter. He stated that the visibility again diminished, and that he could not see the #1 buoy, marking the northern boundary of the entrance to Bar Channel as the vessel passed by. At this time, the vessel was making approximately 10 knots.

The pilot stated that he used the VRM (variable range marker) set at 0.33 nm as a reference off the Island of Yerba Buena as he made his approach to the bridge, as was his usual practice. The pilot stated the 0.33 nm distance off Yerba Buena Island keeps the vessel at approximately the mid-point of the Delta-Echo span of the towers of the Bay Bridge. As the *Cosco Busan* passed close to the No. 1 buoy off the southwest tip of the island, the pilot issued rudder orders to cause the vessel's heading to start to come left. The ship's heading continued to swing further left and with the ship still making about 10 knots, the ship's heading was soon almost parallel to the bridge with a gyro heading of approximately 241 degrees.

Vessel Traffic Service (VTS) controller monitoring vessel traffic noticed the ship was out of position for making an approach to the bridge's Delta-Echo span. A VTS controller then contacted the pilot and informed him that their Automatic Information System (AIS) had the *Cosco Busan* on a heading of 235 degrees and asked the pilot if his intentions were still to use the Delta-Echo span. The pilot responded that he still intended to use the delta-echo span and the vessel was swinging around to the northwest with the heading showing 280.

As the *Cosco Busan* started coming right to make its way under the bridge, according to the master's statement to the U.S. Coast Guard, visibility was very low and estimated to be around 30 meters. As the vessel continued its approach to the bridge, the pilot ordered hard starboard rudder and shortly thereafter, the Chief Mate on the bow called to the master via UHF radio, pointing out that the Delta tower was very close. The vessel struck the corner of the fendering system at the base of the Delta tower at approximately 0830. Immediately upon realizing the vessel had allided with the base of the tower the pilot ordered hard to port on the rudder in an attempt to lift the stern of ship away from further impact.

Shortly afterward, the pilot radioed the VTS and informed them of the allision with the tower and that he was proceeding to anchorage 7, located just west of Treasure Island, and that he planned on anchoring the vessel. He notified his pilot office of the incident, and stated that when he saw a sheen of oil in the water at the anchorage, he immediately notified the VTS.

Another San Francisco Bar pilot relieved the pilot of the *Cosco Busan* while the ship was at anchorage 7 and the accident pilot was given a alcohol test (saliva strip) before departing the ship. The accident pilot was then taken to the pilot office for mandatory drug and alcohol testing. Around 1002 and due to the relief pilot's concern over the vessel's draft and the water depth at anchorage 7, the *Cosco Busan* heaved anchor and shifted to anchorage 9, located just south of the Bay Bridge, where the vessel again anchored.

D. Details of the Investigation

The Environmental Response Group documented the actions taken by the U.S. Coast Guard, State, local, and contracted responders immediately following notification that the *Cosco Busan* had allided with the fendering system on the Delta Tower of the Oakland Bay Bridge. The group's investigation focused on initial notifications and actions, as well as spill quantification that ensued in the 24-hour period immediately following the incident. Documentation concerning remediation of the spill site, including information related to the containment and recovery of intermediate fuel oil (IFO-380), and the environmental impact of the spill on the Bay Area has been and is continuing to be collected as it becomes available.

FIGURE 1 – PHOTOGRAPH OF DAMAGE TO THE *COSCO BUSAN*

E. Chronology of Initial Notifications

U.S. Coast Guard Actions

On November 7, 2007 at 0830, the Coast Guard Vessel Traffic Services (VTS) was notified by the pilot of the *Cosco Busan* that the vessel had allided with the fendering system on the Delta Tower of the Oakland Bay Bridge. VTS in turn notified the Coast Guard Sector San Francisco Command Center (SCC) Situation Unit watchstander at 0832. The watchstander proceeded to inform the on duty Command Duty Officer in the SCC of the situation, and immediately began making internal chain of command notifications and activated Incident Management Division (IMD) personnel, including a Pollution Investigation (PI) Team. At 0836 the SCC issued a safety marine information bulletin concerning the allision to vessels in the area that warned them to stay 100 yards from the *Cosco Busan* and to transit the area with caution. The SCC proceeded to brief the Coast Guard Marine Casualty Investigating Officer and the District-11 Bridge Administrator at 0837 and 0840, respectively. The SCC contacted the *Cosco Busan* agent at 0922 regarding notifications and was told that the contracted oil spill response organizations had been contacted.

The Sector Commander arrived at the SCC shortly after 0837 following receipt of a telephone call from the President of the San Francisco Bar Pilot Association that alerted him to the incident, and was briefed by the SCC on the current status of the situation.

At 0846 the SCC briefed the crew of STA SF utility boat UTB-41392 for the launch to transport the PI team to investigate damage to the Bay Bridge and the *Cosco Busan*. The PI team was onboard UTB-41392 en route for the Bay Bridge by 0903. While en route

the PI team reported its observations regarding oil in the water, damage to the vessel, and also sent a photograph of the vessel damage to IMD personnel via cell phone. The team arrived at the *Cosco Busan* around 0930, received permission to board around 0947, and was on the vessel to assess the situation and determine the quantity of fuel oil released.

At around 0930 a virtual brief via a conference call was conducted between the Coast Guard Deputy Commanding Officer, Sector Commander, and members of his staff, including the Chiefs of Response and Prevention, acting IMD Chief and IMD personnel, and the Command Duty Officer. Then at 0945 the off-going Command Duty Officer initiated a Critical Incident Communication, or CIC call, to Coast Guard Headquarters, Pacific Area Command, and District-11, informing all parties of the allision, limited visibility conditions, reports of a three-foot wide oil slick stretching from Bay Bridge to the vessel, the 10 barrel (bbl) fuel loss reported by the relief pilot, and the high media interest. The situation was not seen as a potential critical incident and thus was to be managed at the Sector level.

Around 0955 the acting IMD Chief contacted NOAA to request an oil spill trajectory forecast based on the location of the incident, the position of vessel at Anchorage 7, the times for each, and the initially estimated 10 bbl fuel loss.

About the same time the *Cosco Busan* relief pilot contacted VTS concerning desired movement to Anchorage 9 due to changing tides at which time the request was passed on the Command Duty Officer. Based on information indicating that the fuel oil release had subsided, the *Cosco Busan* was granted permission to move by the Sector Commander at 0956.

At 1012, the SCC received further information from the O'Brien's Group, the Qualified Individual for the *Cosco Busan*, that contracted oil spill response organization (OSRO) teams were being assembled. Around 1030 the PI team confirmed that the *Cosco Busan* was no longer discharging product and that an estimated that 0.4 metric tons, or roughly 146 gallons of fuel was lost. However, the PI team member making the report stated that he was uncertain about the figure.

The Coast Guard IMD and California Department of Fish and Game established a shoreline cleanup and assessment team (SCAT) to determine the extent of the oil and its impact on the shoreline. The SCAT team began conducting assessments around 1200.

The Coast Guard attempted to arrange for a helicopter to land on Yerba Buena Island to take the Sector Commander on an overflight. However, the helicopter experienced a flight casualty at 1455 and returned to base. Alternatively the Sector Commander went out on a Coast Guard small boat around 1455 to assess the scene.

In order to facilitate an organized approach, document actions taken, and to ensure that necessary notifications are made, the SCC has Quick Response Sheets (QRS) at their disposal for various situations, including oil spills and allisions. The oil spill QRS contains a checklist of actions to be taken that includes notifying the Federal On-Scene

Coordinator (FOSC), Chiefs of IMD and Response, and Investigating Officer, and creating a MISLE notification. The checklist also instructs the watchstander using it to ensure that California Office of Emergency Services (OES) and the National Response Center were notified, and that the Responsible Party[1] takes sufficient action to remediate the spill. On the day of the *Cosco Busan* accident the SCC did not follow or complete a QRS, but went through logical notifications, including those mentioned in this section, which, according to the SCC, satisfied the intent of the document.

ATTACHMENT 1 – TRANSCRIPT OF VTS TELEPHONE CALLS FROM NOVEMBER 7, 2007
ATTACHMENT 2 – USCG MISLE CASE #381733
ATTACHMENT 3 – WRITTEN STATEMENT OF LTJG JESSICA SNYDER
ATTACHMENT 4 – OIL SPILL QUICK RESPONSE SHEET (QRS)

State of California Actions

At 0925, the State On-Scene Coordinator (SOSC) arrived at Yerba Buena Island to attend a previously scheduled meeting, when he was verbally notified of the *Cosco Busan*-Bay Bridge allision by a Coast Guard Petty Officer.[2] The SOSC directed Department of Fish and Game – Oil Spill Prevention and Response (DFG-OSPR) investigators to check the area of the west span of the Bay Bridge and the San Francisco Ferry terminal area. The SOSC proceeded to the Coast Guard Incident Command Center for an initial briefing. At around 0945, the SOSC contacted the DFG-OSPR Dispatch Center and learned that the State OES Warning Center had not yet received notification of this incident. Also at 0945, the SOSC established a Unified Command, which at that time consisted of a Coast Guard IMD Lieutenant (junior grade) and Marine Science Technician Chief. Concerned about the potential for a large spill due to the size of the ship, the SOSC activated a full DFG-OSPR Field Response Team (FRT) consisting of an oil spill prevention specialist, biologist and a warden. The SOSC notified the DFG-OSPR Deputy Administrator of the Bay Bridge allision at 0951, but reported no oil spillage quantity at that time.

Between 1000 and 1030, the SOSC learned that the Qualified Individual for the *Cosco Busan* was the O'Brien's Group and that local oil spill response contractors were being employed to remediate the spill. By 1055, the SOSC was informed that the O'Brien's Group contractors had two skimming vessels on the scene.

At 1054, the SOSC received a report that the Coast Guard PI Team had quantified the spill at 146 gallons. The SOSC told Safety Board investigators in a post-accident interview that he did not give much credence to the 146-gallon report, and knew that the FRT team would soon accurately quantify the spill. Meanwhile and throughout the day, the SOSC received reports of oil sightings from various sources, including ferry operators traversing oil slicks, and from SCAT team assessments. DFG personnel notified trustees and wildlife sanctuary personnel at 1143 that a discharge of about 140-gallons of oil had occurred in San Francisco Bay.

[1] The owner of the vessel, Fleet Management, or their contracted Qualified Individual, The O'Brien's Group
[2] Event times cited were obtained from Lt. Rob Roberts (SOSC) timeline and/or during a 3.12.08 interview.

The SOSC also told Safety Board investigators during his interview that he incorrectly assumed that the FRT had gotten underway to the *Cosco Busan* by 1000 and that he later noticed the team departing the dock at 1205 while he was involved in the press conference outside of the incident command center.

At 1244, the SOSC received the NOAA oil spill trajectory forecast that the Coast Guard had requested earlier. The SOSC then referred to the Area Contingency Plan in order to determine where to direct oil spill response assets. The SOSC then communicated with the commercial OSRO who assured that equipment was being directed to locations in San Francisco Bay where they were encountering oil. The SOSC was unable to provide any further direction to the contractors because of the inability to conduct overflight operations in the heavy fog, and thus have available real-time oil position.

At 1358, the SOSC contacted the DFG-OSPR Legislative Liaison and requested that local California State Senate and Assembly members be notified of the spill.

The SOSC contacted the Incident Commander (IC) from the O'Brien's Group at about 1415 as he was still en route to Yerba Buena Island from Ventura, California. The SOSC told the IC that he would not be recognized as part of the UC until he arrived on scene. At 1600 an OSRO representative joined the Unified Command as acting IC while the intended IC was still en route, and the Sector Commander assumed the role of FOSC.

The FRT team disembarked the Cosco Busan and boarded a Coast Guard boat at around 1500 to return to the Incident Command Center at Yerba Buena Island. At about 1600, the OSPS advised the SOSC that 58,020 gallons of IFO-380 fuel oil had released from the Cosco Busan and explained his calculation. At around 1700 the SOSC reported the 58,020 gallon figure to the Unified Command at the Incident Command Post on Yerba Buena Island and the Oil Spill Prevention Specialist described the method he used to arrive at the quantification.

The SOSC notified the DFG-OSPR Deputy Administrator at 1715 of the updated spill quantification.[3] The DFG-OSPR Deputy Administrator then provided the State OES with the updated spill quantification figure of 58,000 gallons. At 1717, the SOSC discussed the updated spill quantification with the Sector Commander. A decision was made by the UC at 1730 to suspend nighttime on-water recovery operations due to safety concerns.

At 2000 the SOSC and Deputy Commanding Officer conducted a conference call with the State OES and numerous representatives of local jurisdictions in order to provide them with the updated 58,000 gallon spill quantification figure.

ATTACHMENT 5 – DFG-OSPR TIMELINE
ATTACHMENT 6 – MARCH 12, 2008 INTERVIEW OF LT. ROB ROBERTS, DFG-OSPR

[3] This time was documented by the SOSC's cellular telephone call log.

California Office of Emergency Services (OES) Actions

At 0942, the California Office of Emergency Services (OES) Warning Center logged a telephone report from the O'Brien's Group, advising of an unknown quantity of fuel oil spilled from the *Cosco Busan* into San Francisco Bay. The incident location was reported as Oakland, Alameda County. Because the incident was reported as occurring in Oakland, the only local agencies notified by the State OES Warning Center were the Oakland Fire Department and the Alameda County Department of Environmental Health as dictated by the Standard Operating Procedure for Hazardous Materials Incidents, SOP-SIII.05 in place at the time of the accident[4].

At 1028, the Warning Center received an email from the DFG-OSPR Deputy Administrator advising that the resulting breech of the vessel hull appears to have released 10 bbls of oil into San Francisco Bay.

The State OES Warning Center received a situation update at 1515, when a fisherman's radio traffic reported a 1-mile oil slick. Again, the only local-government agencies notified of this report were the Oakland Fire Department and Alameda County Department of Environmental Health. The situation update was also forwarded to the Coast Guard and DFG-OSPR.

At 1540, the DFG-OSPR Deputy Administrator sent an email message to the OES Warning Center advising that the estimated spill volume remained at about 400 gallons or 10 bbls.

The DFG-OSPR Deputy Administrator notified the OES Warning Center at 1740 that the recently completed quantification, using standard marine engineering practices, indicated that the amount of fuel oil missing from the *Cosco Busan* was 1840 bbls. State OES again only notified Oakland Fire Department and Alameda County Department of Environmental Health of the updated oil spill quantification, in addition to various State and Federal agencies that had been entered on the OES notification list.

At 1846, the DFG-OSPR Deputy Administrator emailed State OES informing that the updated spill quantification was now 1377 bbls.

ATTACHMENT 28 – PRELIMINARY OES CHRONOLOGY (11.15.07)
ATTACHMENT 29 – SOP-SIII.05: STANDARD OPERATING PROCEDURE FOR HAZARDOUS MATERIALS INCIDENTS (10.20.04)
ATTACHMENT 30 –SOP-SIII.05: STANDARD OPERATING PROCEDURE FOR HAZARDOUS MATERIALS INCIDENTS (1.25.08)

Qualified Individual (QI) Actions

The Qualified Individual (QI), the O'Brien's Group, was notified of the *Cosco Busan* allision at about 0915 by the master of the vessel. Upon learning of the incident the QI

[4] SOP-SIII.05 was revised on 1.25.08 to include notifications to all counties in the Bay area

proceeded to notify the California OES Warning Center at 0942 and the National Response Center[5] at 0949. The QI also began attempts to locate the employee who was to serve as the initial IC on scene. At the time, this employee was in Ventura, CA (approximately 360 miles south of San Francisco attending an exercise. The IC was reached at 0950 and was informed that Marine Spill Response Corporation (MSRC), a spill response and recovery company, had already been notified by the City of San Francisco to respond under a contract between the city and MSRC and that MSRC already had skimmers mobilized. The IC was advised to contact MSRC and National Response Corporation-Environmental Services (NRCES) regarding activation of resources; activation was confirmed at 0951 and 1041, respectively. The QI also suggested that the IC contact the Sector San Francisco SCC to advise them that the Oil Spill Response Organizations (OSRO) were activated and that the IC was en route.

At 0955 the IC reported to the QI headquarters that the MSRC Spill Chaser crew observed that no fuel oil was discharging form the damaged area on the *Cosco Busan*. The QI spoke with the Coast Guard SCC at 1007, and then with Fleet Management at 1022, expressing the urgency for the vessel's crew to determine the quantity of fuel discharged as it was high priority to Sector San Francisco.

The IC was en route to San Francisco by 1030. While en route the IC maintained contact with MSRC and NRCES, as well as the Coast Guard SCC, and updated the QI regularly on information received such as observed visibility and oil sightings, as well as equipment deployment, operations and recovery as it became available. The IC was also putting together his response team. The IC indicated during his post-accident interview with Safety Board investigators that he spoke with the SOSC once as mentioned in the previous section, but was not in contact with the FOSC before his arrival at the command post later in the evening around 1800.

While en route the IC kept the QI informed of any information he received from the OSRO or Coast Guard. At 1045 the IC reported that MSRC and NRCES resources were mobilized and that sheen and small black ribbons were spotted. At 1250 the IC reported that the Coast Guard set up its initial command post on Yerba Buena Island and was running the NOAA trajectory. At 1309 the IC relayed reports that heavy streamers of oil had been spotted, visibility was improving, and there was a strong odor of oil in the San Francisco Bay Area. As a result of this information the QI requested that MSRC activate the Pacific Responder, a larger capacity skimming vessel based out of Richmond. At 1423 the IC reported to the QI that oil was sighted drifting ocean-ward of the Golden Gate Bridge in heavy streamers, as a result additional OSRO resources and the California Oiled Wildlife Care Network were activated. The IC arrived on scene at roughly 1800.

ATTACHMENT 7 – THE O'BRIEN'S GROUP VESSEL SPILL REPORT
ATTACHMENT 8 – THE O'BRIEN'S GROUP OSRO NOTIFICATIONS
ATTACHMENT 9 – QI NOTES OF BEN BENSON, THE O'BRIEN'S GROUP
ATTACHMENT 10 – THE O'BRIEN'S GROUP AGENCY NOTIFICATION LOG
ATTACHMENT 11 – MARCH 14, 2008 INTERVIEW OF BARRY MCFARLAND

[5] NRC Report#853865

ATTACHMENT 12 – OES HAZARDOUS MATERIALS SPILL REPORT (11.7.07)
ATTACHMENT 13 – NRC REPORT #853865

F. Reports of Oil and Debris

The President of the San Francisco Bar Pilots Association (SFBPA) called the Coast Guard Sector Commander for the first time at 0837[6] to inform him of the allision, and then again at 0846 to report his observations of damage to the bridge fendering system and presence of oil in the vicinity of the delta tower. He proceeded to contact Coast Guard VTS at 0849 to report this information and alerted them that a fuel tank had been punctured. He requested that the Army Corp of Engineers be contacted for collection of floating debris south of the Bridge.

At 0852 several pilots from the SFBPA, including the President and relief pilot arrived at the *Cosco Busan* as it was anchoring at Anchorage 7. The President noted in a written statement that upon arrival a "substantial flow of oil was pouring out of the after part of the damaged area" and that the discharge appeared to subside within about 10 minutes. He immediately telephoned the Coast Guard Sector Commander for the third time to relay his observations, but was unable to reach him. He then contacted VTS at 0855 to inform them that "quite a bit" of fuel was still being "dumped" into the water and recommended that they activate spill response. VTS immediately notified the SCC who stated that they were aware of the oil and already had responders headed out to the vessel.

According to Coast Guard VTS transcripts from November 7, 2007 at 0857 the pilot of the *Cosco Busan* called to report that they may have punctured a hole in a fuel tank and stated that "a slick is starting to form around the ship" and "there's definitely oil in the water." VTS told him that they were aware of the situation and that the Coast Guard was responding for both fuel and debris.

Within the hour immediately following the allision, Coast Guard VTS received two reports of oil and debris in the water from vessels in the area. At 0855 M/V *Encinal* reported passing through "some kind of oil spill and a large amount of debris through Anchorage 8, south of the bridge." Similarly at 0914 the M/V *Lynn Marie*, en route from Anchorage 9 approaching the Bravo–Charlie span of the Bay Bridge, reported passing through "a large oil sheen on the water south of the bridge" and debris. The vessel's master observed a "pretty significant" amount of oil that stretched from the center span of Bravo–Charlie all the way over to Alpha–Bravo. The Coast Guard SCC was not notified of either sighting, which depicted real-time position of oil in the water. The debris sighting from the M/V *Lynn Marie* was reported to the ACOE at 0922 to commence debris cleanup.

At 0935, the first responding OSRO crews who arrived in the vicinity of the Bay Bridge encountered heavy oil sheen and odors on the water. By 1000 the OSRO crews reported that they were in heavy oil and their skimming operations began.

[6] All times associated with the President of the SFBPA were taken from his personal cell phone records.

Throughout the first day oil sightings were reported to the Unified Command by Coast Guard SCAT teams sent to area marinas and shorelines, as well as other parties in the area. According to the San Francisco oil spill timeline the Executive Director of the Port of San Francisco evacuated the office at Pier One as a result of noxious fumes and complaints from staff. Entries taken from the DFG timeline previously referenced indicate at 1050, a DFG-OSPR Warden confirmed that there was a moderate amount of oil along the San Francisco Ferry Building. Additionally sheen and black oil globules were observed at piers north of the Bay Bridge along the San Francisco waterfront around 1229. At 1310 that oil was observed on Alcatraz Island and that air monitoring was requested. The timeline also states that the State Parks supervisor reported oil washing up on Angel Island at 1355.

ATTACHMENT 14 – WRITTEN STATEMENT OF CAPT PETER MCISAAC STATEMENT, SFBPA
ATTACHMENT 15 – TRANSCRIPT OF ENCINAL CALL TO VTS ON NOVEMBER 7, 2007
ATTACHMENT 16 – CITY AND COUNTY OF SAN FRANCISCO OIL SPILL TIMELINE

G. Spill Quantification Efforts

Coast Guard Pollution Investigation Team

A Pollution Investigation (PI) team was en route to investigate the Bay Bridge and the *Cosco Busan* at approximately 0903. The PI team arrived at the bridge at 0910, and then proceeded to follow an oil slick about 3 ft – 4 ft wide from the bridge to Anchorage 7 where the *Cosco Busan* was anchored. At about 0930, the PI team arrived alongside the *Cosco Busan* where they observed a gash in the hull estimated to be about 100 ft long and 10 ft high, situated roughly 10 ft above waterline. The team also observed a small stream of oil actively flowing from it that subsided in about 10 minutes. The PI team reported all of these observations and sent a photograph documenting the damage to Coast Guard IMD and SCC personnel via cell phone before receiving permission to board the vessel around 0947.

Once aboard the vessel, the PI team immediately interviewed the Chief Engineer, who indicated he was uncertain whether port side tanks no. 3, 4 or both were punctured. The PI Team reviewed the oil record book to determine the *Cosco Busan* tank no. 3 and 4 fuel levels upon departure, which were 80.4 and 742.5 metric tons (MT), respectively. The Chief Engineer explained that the current fuel levels in tanks nos. 3 and 4 were 50MT and 550MT, and that approximately 30MT and 192MT, respectively, had been transferred from these tanks into the ship's double bottom bunker tanks based on the gauge readings. They requested that the tanks be sounded but were informed by the chief engineer that the sounding tubes were bent. Based on the location of the fuel tanks as shown on the ship's diagrams relative to that of the gash in the hull, and the level of fuel oil remaining in each tank, the PI team agreed that the rupture was most likely contained to tank no. 3. At around 1030, the PI team briefed the SCC that the total capacity of both tanks at departure was 879.2 MT, that they believed the most likely source of discharge

to be tank no. 3, and that the net loss was 0.4 metric tons, which the PI Team calculated to be roughly 146 gallons. They cautioned that these figures were rough due to the bent sounding tubes and suggested that they get a spill estimate based on the description of a 2 mile long, 3-4ft wide trail of thick oil that he previously reported seeing. The PI Team departed the *Cosco Busan* around 1130 and arrived at Yerba Buena Island around 1200.

ATTACHMENT 17 – WRITTEN STATEMENT OF MST2 PETER ANDERSON

DFG-OSPR Field Response Team

The Field Response Team (FRT) arrived at Yerba Buena Island around 0935 where it was to be transported to the *Cosco Busan*. At the time there was no transportation available and the team waited nearly two-and-a-half hours for a Coast Guard boat to arrive around 1205. At that point the FRT, accompanied by another Coast Guard pollution investigator, departed Yerba Buena Island for the *Cosco Busan*. The team boarded the *Cosco Busan* at about 1230, signed in, and was taken to the bridge to speak with the captain and helmsman. At approximately 1330 the team was taken to the captain's cabin and the oil spill prevention specialist began interviewing the chief engineer about the events, breached fuel tanks, and amount of fuel oil lost. The chief engineer informed him that the compromised fuel tanks were port side tanks no. 3 and no. 4. The port side tank no. 2 was also compromised, but it was a water ballast tank and did not release any oil. The chief engineer also told him that he did not believe port side tank no. 5 was damaged. In order to verify that tank no. 5 was not leaking, the DFG-OSPR oil spill prevention specialist directed an oilman to collect soundings from the tank every 3 minutes and monitor the results.

The oil spill prevention specialist completed tank soundings and measurements by 1315 and then began quantifying the amount of fuel oil lost. Calculations of the lost fuel involved subtracting the total amount of fuel presently contained in port side tank no. 3, no. 4, and the double bottom tank where fuel was transferred, from the total amount of fuel contained in these tanks at the time of vessel's departure. By roughly 1335 the oil spill prevention specialist determined that approximately 219 m^3 (58,020 gallons) of fuel oil was lost.

At this point the warden contacted the Coast Guard to request that a boat be sent to pick the team up and transport them back to Yerba Buena Island. The FRT again had to wait for a boat. By around 1500 a Coast Guard boat arrived to take the team back. Upon arrival at Yerba Buena Island, the oil spill prevention specialist first advised the SOSC of the 58,000 gallon figure around 1600 and explained how he determined the quantity. This was the first time that anyone had heard this figure, which was substantially larger than what was initially reported, since the oil spill prevention specialist did not relay it back to anyone prior to his arrival at Yerba Buena Island. At approximately 1700 the SOSC reported to the Unified Command that approximately 1,375 bbls or 58,000 gallons of fuel oil was discharged into the San Francisco Bay, and the oil spill prevention specialist explained his calculations.

The following day, the oil spill prevention specialist returned to the *Cosco Busan* to conduct soundings of all the ship's fuel tanks, not just those breached, with the chief engineer and as a result updated the total amount of fuel oil lost to be 53,653.33 gallons.

ATTACHMENT 18 – MARCH 11, 2008 INTERVIEW OF ROY MATHUR, DFG-OSPR
ATTACHMENT 19 – DFG-OSPR CALCULATION OF SPILLED QUANTITY
ATTACHMENT 20 – ROY MATHUR TIMELINE

H. Environmental Response Operations

Positioning of Recovery Equipment

Oil spill response professionals maintain that their ability to locate and assess the magnitude of an oil spill at sea level is extremely difficult, and therefore the most reliable method of spill assessment is visual observation from aircraft. These observations are used by the oil spill responders to determine the present status of oil distribution, direct their recovery assets, and forecast subsequent oil movements. A number of remote sensing technologies are also available, including airborne radar, laser fluorescence, microwave radiometer, infrared-ultraviolet line scanner, and satellite systems; however none of these technologies were employed during the *Cosco Busan* spill response.[7]

The ability to assess the overall extent of the fuel oil spill via overflights was affected by limited visibility throughout most of the day. The first helicopter to get airborne did so between about 1336 and 1448, and was a MSRC contracted flight. The second overflight using the same MSRC aircraft launched at approximately 1506 and landed at around 1547. The third overflight of the day was a Coast Guard flight that took off at roughly 1641 and was the first time the Coast Guard was able to take flight.

During two overflights chartered by MSRC at 1336 and 1506, observers noted an oil sheen, but no large pockets of oil forming anywhere on the Bay. Based on these observations, the MSRC and NRCES utilized their local knowledge of the Bay currents and tides to position their recovery assets at locations where they expected to encounter and intercept oil streamers.

At 1246, the Unified Command received from NOAA a forecast trajectory of the oil spill; however this data was not made available to the oil spill responders.

Recovery Capability

According to records submitted by the MSRC and NRCES, as of 0950 approximately one hour and 20 minutes after the *Cosco Busan* allided with the fendering system on the Delta Tower of the Bay Bridge there were 8,588 bbls/day of skimming capacity, or estimated

[7] NOAA, Hazardous Materials Response and Assessment Division, Aerial Observation of Oil at Sea, 1996.

daily recovery capacity[8] on site with two skimming vessels at the *Cosco Busan* from MSRC and NRCES. This equipment package also included 5,000 feet of boom. Roughly two hours after the allision an additional 31,888 bbls/day of skimming capacity was on-scene with another four vessels and 8,000 feet of boom, bringing the total to 40,476 bbls/day. Roughly six hours after the allision, there was an additional 34,567 bbls/day of skimming capacity on-scene responding to the fuel spill, bringing the total on-site skimming capacity to 75,043 bbls/day. At the end of the first day's operational period, there were a total of eight on-water skimming vessels with 20 support vessels, 19,000 feet of boom, and approximately 160 personnel from various federal, state and local agencies and contact personnel.

Requirements set forth in the nontank vessel response capability standards for On-Water Containment and Recovery Services for a Reasonable Worst Case Spill as outlined in Title 14 of the California Code of Regulations are for the response equipment to be on location within a two-hour time frame. And further, to have on site in less than a six-hour time frame 2,500 bbls/day (4,375gal/hr) skimming capacity equipment. A Reasonable Worst Case Spill is defined as a spill of the total volume of the largest fuel tank on the nontank vessel, which in the case of the *Cosco Busan* was 5,874 bbls or 246,708 gallons.

ATTACHMENT 21 – MSRC TIMELINE
ATTACHMENT 22 – MSRC OIL SPILL RESPONSE CHRONOLOGY
ATTACHMENT 23 – NRCES TIMELINE

Amount of Oil Recovered

A total of 53,569 gallons of IFO-380 was discharged into the San Francisco Bay as a result of the *Cosco Busan* allision. Response efforts continued far beyond the initial first day response, though the majority of oil was recovered in the two weeks immediately following the incident. As of April 2, 2008 a total of 22,891.5 gallons of oil, or nearly 43% of the total amount of oil spilled was recovered from the water and land. The on water recovery portion of the response is complete, but some shoreline remediation continues to date.

ATTACHMENT 24 – ICS 209 INCIDENT STATUS SUMMARY (APRIL 2, 2008)

[8] **Effective Daily Recovery Capacity (EDRC):** Indicates the amount of oil that can be recovered in a 24-hour day based solely on the pumping capacity of the device. This figure also includes a de-rating factor of 20%, indicating that 20% of what is being pumped is oil and 80% is water. EDRC is converted from gallons per minute to bbls per day using the following formula: EDRC=[(gal/min)*(60 min/hr)*(24 hrs/day)*(bbls/42 gal)]*.20 derating factor.

I. Environmental Impact

Site Description

The oil spill that resulted from the bridge allision damage to the *Cosco Busan* impacted and endangered many environmentally sensitive sites located in several jurisdictions within in the San Francisco Bay Area, including San Francisco, Marin, Contra Costa, Alameda and San Mateo Counties. San Francisco Bay and its tributaries encompass more than 5,000 miles of shore and coastline. The San Francisco Bay Area is generally characterized by intermittent sand beaches and rocky tidal zones that are habitat to many species of marine mammals, migratory waterfowl and shorebirds. The shoreline of more urbanized areas of the City of San Francisco and Alameda County largely consists of manmade bulkhead, piers and riprap structures. Tidal currents within San Francisco Bay are often strong, approaching 6 knots. Channel bottoms generally consist of soft unconsolidated sediment. The San Francisco Bay estuary encompasses an area of about 1,600 square miles, including 700 miles of tributaries, and 1,100 miles of levees. The waters of two major California Rivers, the Sacramento and San Joaquin, and five lesser rivers flow through the estuary to the Pacific Ocean.

Considered to be one of the nation's most biologically productive estuaries, the Bay Area supports diverse populations of fish, crabs, clams and other aquatic life. The Dungeness crab and Pacific herring are important recreational and commercially harvested species that utilize the Bay Area estuary as a major nursery area. The San Francisco Bay estuary is also home to a few hundred harbor seals and sea lions. The natural resources placed at risk by the *Cosco Busan* oil spill included several national parks, national marine sanctuaries and State parks. The San Francisco Bay area is also an important source of aquatic recreation for its nine densely populated counties, which comprise approximately one-third of the regions 20 million population.

Property Damage

Intermediate grade fuel oil (IFO-380) from the *Cosco Busan* impacted five Bay Area counties; San Francisco, Marin, Contra Costa, San Mateo, and Alameda. A total of over 42 kilometers (26 miles) of shoreline were impacted by oil to varying degrees, with San Francisco, Marin and Alameda Counties receiving the bulk of the contamination. At one point authorities closed 27 public beaches. Of the substrates impacted, approximately 85% were rip-rap, seawall and sand.

Fisheries were impacted by a fishery closure of the bay and a delay to the start of the Dungeness crab season, a multi-million dollar industry. The California Department of Fish and Game collected samples of representative fish and wildlife species to evaluate the impact of the contamination on the local fauna and eventually lifted the suspension on November 29, 2007.

As of April 2, 2008 according to the ICS 209 Incident Status Summary, in response to the *Cosco Busan* oil spill 2,937 birds from over 50 species, including some threatened and

endangered species were collected live and dead from impacted bodies of water and associated shoreline habitats. Of the total birds collected, 1,084 birds were found alive, however only 421 of those birds were able to be cleaned and released. Thus over 2,500 birds have died so far as a result of the oil spill.

ATTACHMENT 25 – SAN FRANCISCO BAY OIL SPILL UPDATE: FISHERIES SUSPENSION LIFTED, NOVEMBER 29, 2007

J. Regulations and Standards

National Contingency Plan

The National Oil and Hazardous Substances Pollution Contingency Plan, or the National Contingency Plan (NCP), is the federal government's blueprint for responding to both oil spills and hazardous substance releases. The purpose of the NCP is to provide the organizational structure and procedures for preparing for and responding to discharges of oil into or on navigable waters of the U.S., and releases of hazardous substances, pollutants and contaminants which may present an imminent and substantial danger to public health or the welfare of the United States. The NCP originally published in 1968 was the result of the country's efforts to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans, and latest revisions finalized in 1994 were completed to reflect the oil spill provisions of the Oil Pollution Act of 1990.

San Francisco Bay and Delta Area Contingency Plan

The Area Contingency Plan (ACP) is a guidance document created by the Area Committees and California Department of Fish & Game, promulgated by the Coast Guard, for resource protection for local community agencies and companies that operate around waterways within the State of California. The State of California has 6 area committees, each of which is responsible for having its own area specific ACP. The San Francisco Bay and Delta Area Committee is responsible for area of the bay designated as ACP-2. ACP-2 is further subdivided into 10 geographical response areas (GRA) based on their location and their geography. The document discusses the unified command structure and provides guidance for the setting of the immediate response objectives. It provides the guidance for recovery of the released substances and addresses the on water recovery for the released substance and emergency response operations, including over-flights and staging areas for the response equipment, as well as the future protection of the area resources including wildlife. It also provides the protocols for the timing for media briefings.

The ACP also addresses the correspondence and permits issued in the response. It includes the explanation of the Notice of Federal Interest and the Notice of Federal Assumption. The plan includes the meeting and working frequencies of the UC, (Responsible Party, U.S. Coast Guard, County OES and the local government agencies).

It also includes the Coast Guard communications capabilities and discusses the use of the Coast Guard Safety Support Center and Pacific Strike Team. The plan addresses the Initial Awareness, Assessment and Notification Sequence and has the outline/draft for the Incident Action Plan (IAP). It also discusses the Oil Spill Liability Trust Fund and the California Oil spill Response Trust Fund and the relationship with the responsible party. The ACP encompasses the wildlife Primary, Secondary, and Tertiary Response process and protocols, including volunteer jobs, volunteer training courses and the use of the Oiled Wildlife Care Network Rehabilitation Facilities.

California Oil Spill Contingency Plans

Title 14 of the California Code of Regulations[9] requires that all nontank vessels have a Nontank Vessel Contingency Plan (NTVP) prepared and submitted in accordance with the provisions set forth in the regulations in order to operate in marine waters. The plans should be consistent with the State Marine Oil Spill Contingency Plan and not conflict with the National Contingency Plan or the applicable Federal Area contingency Plans. Fleet contingency plans are submitted by an owner/operator that has a number of nontank vessels that transit the same or substantially the same routes in marine waters. Resubmission for review is to take place once every 5 years.

The purpose of this document is to set the planning requirement for oil spill prevention and response for nontank vessels in California. It also requires that owner/operators have contracted resources to respond to the Reasonable Worst Case Spill in specific time frames. A reasonable worst case spill is defined as *a spill of the total volume of the largest fuel tank on the nontank vessel*, which in the case of the *Cosco Busan* was 5,874 bbls or 246,708 gallons. Section H of the NTVP contains on-water containment and recovery parameters including the nontank vessel's contracted oil spill response organization(s), which were MSRC and NRCES in this case, response capability standards, on-water response equipment and services, and on-water response and recovery strategies. Table H-2 provides a summary of Section 827.02(h)(2)(A)&(B), regarding on-water containment and recovery services for a Reasonable Worst Case Spill.

[9] Title 14, Division 1,Subdivision 4, Office of Spill Prevention and Response, Chapter 3. Oil Spill Prevention and Response Planning Sub-Chapter 4. Oil Spill Contingency Plans, Nontank Vessels Sections 825.01 – 827.02.

	Time	Initial Recovery Capability	Initial Recovery Response Time	Pre-Staging Requirement Non Bunkering
San Francisco Harbor	<6 Hours	2500 BBL/day	2 Hours	–
Los Angeles/Long Beach	<6 Hours	2500 BBL/day	2 Hours	–
Stockton & Sacramento	<6 Hours	2500 BBL/day	2 Hours	2500 BBL
Santa Barbara Channel	<12 Hours	2500 BBL/day	2 Hours	2500 BBL Humboldt Bay to Monterey Bay Only
Balance of the Coast	<18 Hours	2500 BBL/day	2 Hours	--

FIGURE 2 - ON-WATER CONTAINMENT & RECOVERY SERVICES FOR A REASONABLE WORST CASE SPILL

The equipment contracted must be applicable to the areas of intended use and the trajectory analyses are required to be conducted to determine probable impact on the coastline. The plan contains the required information, calculations, studies, maps, related data & information that response personnel will need at the time of spill to facilitate immediate notification and response actions. Additional information contained in the NTVP includes items such as nontank vessel fuel and tank description/capacity, prevention measures, notification procedures, as well as shipboard drills and exercises; including type and frequency. The plan also discusses planning for the staging of response resources, shoreline protection & cleanup, response procedures, oiled wildlife care requirements, spill management team & response organization drills and exercises, temporary storage/waste management, and salvage equipment & services.

ATTACHMENT 26 – TITLE 14 CALIFORNIA CODE OF REGULATIONS (CCR), SUBCHAPTER 4
ATTACHMENT 27 – NONTANK VESSEL CONTINGENCY PLAN (NTVP), SECTION H

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Hazardous Materials Investigator

ATTACHMENTS

ATTACHMENT 1 – TRANSCRIPT OF VTS TELEPHONE CALLS FROM NOVEMBER 7, 2007
ATTACHMENT 2 – USCG MISLE CASE #381733
ATTACHMENT 3 – WRITTEN STATEMENT OF LTJG JESSICA SNYDER
ATTACHMENT 4 – OIL SPILL QUICK RESPONSE SHEET (QRS)
ATTACHMENT 5 – DFG-OSPR TIMELINE
ATTACHMENT 6 – MARCH 12, 2008 INTERVIEW OF LT. ROB ROBERTS, DFG-OSPR
ATTACHMENT 7 – THE O'BRIEN'S GROUP VESSEL SPILL REPORT
ATTACHMENT 8 – THE O'BRIEN'S GROUP OSRO NOTIFICATIONS
ATTACHMENT 9 – QI NOTES OF BEN BENSON, THE O'BRIEN'S GROUP
ATTACHMENT 10 – THE O'BRIEN'S GROUP AGENCY NOTIFICATION LOG
ATTACHMENT 11 – MARCH 14, 2008 INTERVIEW OF BARRY MCFARLAND
ATTACHMENT 12 – OES HAZARDOUS MATERIALS SPILL REPORT (11.7.07)
ATTACHMENT 13 – NRC REPORT #853865
ATTACHMENT 14 – WRITTEN STATEMENT OF CAPT PETER MCISAAC
ATTACHMENT 15 – TRANSCRIPT OF ENCINAL CALL TO VTS ON NOVEMBER 7, 2007
ATTACHMENT 16 – CITY AND COUNTY OF SAN FRANCISCO OIL SPILL TIMELINE
ATTACHMENT 17 – WRITTEN STATEMENT OF MST2 PETER ANDERSON
ATTACHMENT 18 – MARCH 11, 2008 INTERVIEW OF ROY MATHUR, DFG-OSPR
ATTACHMENT 19 – DFG-OSPR CALCULATION OF SPILLED QUANTITY
ATTACHMENT 20 – ROY MATHUR TIMELINE
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ATTACHMENT 28 – PRELIMINARY OES CHRONOLOGY (11.15.07)
ATTACHMENT 29 – SOP-SIII.05: STANDARD OPERATING PROCEDURE FOR HAZARDOUS MATERIALS INCIDENTS (10.20.04)
ATTACHMENT 30 – SOP-SIII.05: STANDARD OPERATING PROCEDURE FOR HAZARDOUS MATERIALS INCIDENTS (1.25.08)